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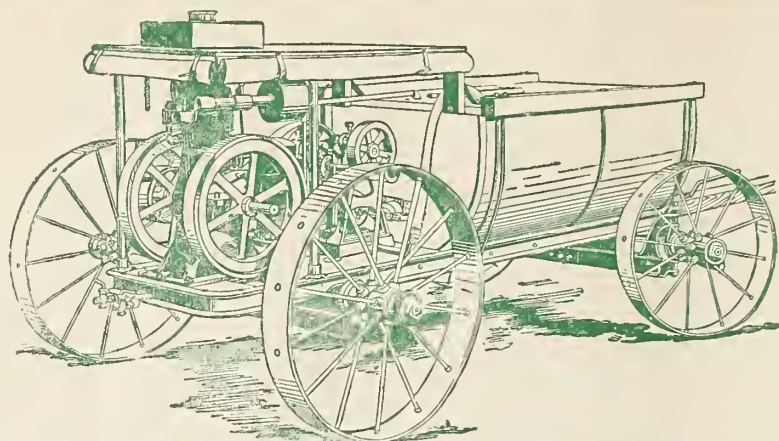
These are the leaf buds taken from a typical tree at the time the delayed dormant spray was applied in 1915. The third twig from the left shows approximately the ideal development. At this time the rosy apple aphid can be destroyed.

BETTER FRUIT PUBLISHING COMPANY, PUBLISHERS, HOOD RIVER, OREGON

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Banking the Fruit Crop

By J. J. Rouse, Cashier Fidelity National Bank, Spokane, at Washington State Horticultural Convention, Kennewick, Wash., January, 1918

WHEN the harvest days are over and the pay check is in sight, this subject of mine ceases to be a problem. The H. C. or L. and the numerous calls for Red Cross and Liberty Bond subscriptions, and other worthy causes which have to be supported at this time, point the way for rapid disbursements of the crop proceeds, so you do not need any suggestions from me as to final disposition of the proceeds via the check-book route. If I am to interest you at all, I take it that it must be by a discussion of ways and means of making, not only the crop itself, but the crop prospects from soup to nuts—or from blossom to loaded car, and in transit to market—a basis for bank credit, in order that the necessary expenses of operation may be met as they accrue.

The ideal loan, sought by commercial banks, is one of definitely fixed maturity date—not too far in the dim future, with an absolutely known and proven self-liquidating power attached. While live-stock loans have greatly increased in volume and popularity with Northwestern banks during the last few years, as have loans arising from the production and distribution of various other products of this favored section, yet wheat was for so a long a time king of our agricultural products that the term "Good as the wheat" still has a real significance. If the horticulturist would like to coin a new commercial phrase, "Good as an apple in the box," he must strive for the standardization of his product and stabilize his marketing methods to an extent that will approach "King Wheat" in sureness of returns at harvest time, on capital invested and labor and expense involved.

It seems to me that the various stages of development through which the fruit industry has passed and is passing, corresponds somewhat to like stages of development through which wheat farming has passed in this country, as well as in the Middle West. There is, however, undoubtedly one striking difference. Whereas the wheat farmer's plant equipment—his land was obtained partially by homestead entry, and the balance at raw material prices, which when developed into a producing plant gave him, in the rise of land values, compensation for the labor, time and money expended in bringing it to a productive basis, the orchardist, in many cases, paid for raw lands and water rights, which were simply the raw materials necessary for the construction of a productive plant—a price equal to the value of the plant when fully equipped and running on a productive basis.

If we regard a farm or an orchard as a plant for the production of food, this state of affairs is comparable to a manufacturer, who pays as much for his site and the materials with which to build his factory, as his factory is worth when completed and ready for productive operation. He is then faced with a loss equal to the cost of labor in constructing the plant, which loss must be written off his books, or he is forced to sell his output at a price sufficient to pay dividends on watered stock to the extent of this increased plant cost.

If his product is highly specialized and non-competitive, he may for a time be able to successfully follow the latter course, but if he must compete with other factories operating on a fair value capitalization, whose stock is not watered, and who are not forced to earn dividends on excessive plant cost, he will sooner or later find a readjustment necessary.

If Northwestern boxed apples are to compete with other food products—and by this I do not mean other apples alone, but other fruits or foods which can be made to take their place on the table and in the dinner pail—then, in my opinion, they will, after the close of this war and the general fall in commodity prices, which is bound to follow, have to be sold at prices to net the grower, after cost of production and marketing is met, a fair return—not on what he may have paid for his land, but on what it is worth.

Of course, a good part of decreased prices, which I believe is bound to come, may be absorbed in correspondingly decreased cost of production, when labor and all materials will doubtless be cheaper, but I do not believe you can successfully compete in after-war markets, at prices which used to pay reasonably fair interest rates, for a few banner years only, on inflated land values. This inflation is one of the principal reasons why the fruit industry has been viewed with more or less suspicion by the bankers in the past, and is one obstacle in the way of easily banking the crop, in the sense of obtaining advances at the various stages of progress from blossom to warehouse. The grower who is the victim of this inflation is more to be pitied than blamed, and the early promoters and exploiters of the fruit industry are no more truly representative of the men upon whom the future of the industry depends than is the unscrupulous bank promoter and organizer representative of the men who have developed and are handling the banking business of this country. Both are fly-by-night parasites looking for easy-money com-

missions, and there is no more place in the general scheme of eternal fitness of things for either than for a fifth wheel for a wagon; and why chambers of commerce and civic organizations the country over, who had the good of the fruit industry at heart, should have been so completely led astray by the wily orchard-land promoter as to assist his game passeth understanding. The only criticism that can be made of the grower who sacrificed to the promoter who sold him raw land at the price of a bearing orchard six or seven years of hard toil necessary to bring the orchard to bearing is an apparent bulldog determination to insist that the promoter was right and that the land is really worth two or three thousand dollars per acre, because during a few banner years when few orchards were in bearing and crops were poor elsewhere and our big, red apples were a new thing in the markets, he was able to sell his crop at fancy prices which paid dividends on his investment.

It is no more fair to judge the fruit business by these few exceptional years, and fix orchard-land values accordingly, than it would be to infer that we will always have two-dollar wheat and adjust wheat-land values accordingly.

Your banker, if he is a safe man to handle the finances of your community, is not going to be so much influenced in his judgment of what he may reasonably expect you to do, by what you did at a brilliant start, as by the general average of what you can do over a period of years. He will also have more confidence in your good judgment if you list your land at sane values on your financial statement, even though your net worth appears smaller than heretofore, for he will see that you have had the nerve to face and admit your loss, if you paid too much for your land, and will have better hopes of you for the future if he sees that not only are you not trying to fool him as to land values, but that you have stopped trying to fool yourself.

Another thing that will tend to increase his confidence in you is a well-kept set of books and records showing exactly what you have been able to do with your orchard since it first came to bearing. Estimates and figures furnished from memory in round, even amounts are one thing, but actual black-and-white figures are another thing. The production of food is by far and away the biggest industry in this country, but undoubtedly the one about which the least is known by accurate, detailed bookkeeping.

The farmer would no doubt be too shrewd to deposit his money in a bank in which he knew no accurate book record was made of each and every transaction, or even in one in which the bookkeeping system was a little faulty, admitting of numerous errors. Yet, with the best of faith, he asks the banker to put the money intrusted to his care into his business and when asked for a financial statement, particularly if full details are required, complains of red-tape and seems to feel that his honesty is at question when simple information is all that is sought.

I venture the guess that not one wheat farmer in five hundred knows the average cost of production and average selling price of wheat per bushel from his own farm over a period of the last five years. He can, perhaps, tell you something of the high and low spots, as, for instance, how he used to sell for thirty cents and how in 1893 he got nothing, and he knows that this year the Government didn't pay him quite \$2.00 in the field, but as to what his average net returns have been for several years, between the high and low price, he is guessing in the dark or trusting to memory. All are agreed, however, that the farmer gets skinned at every turn of the road, although he has no figures to prove it other than the fact that he hasn't much left. Perhaps if accurate records were kept, it would be shown that his business pays him as good or better returns than is paid by some of the alleged soulless corporations. Perhaps his business is not to be blamed if he doesn't keep any of the profits after he gets them.

A banker cannot form accurate opinions regarding other lines of business and the ability of the men engaged in them except from books and records which show what has been done in those businesses, and farming, the biggest business in this country, is certainly no exception. It seems to me that in the fruit business the keeping of records to show the cost per box of producing and delivering the crop, the price received and the net gain or loss ought to be a simple matter. If you want your banker to form a good, sound opinion of your business and your ability to successfully handle it, show him the recorded facts and figures, rather than give him estimates from memory. He doesn't dare trust memory in his own office, and would rather have your records than your memory. Well-kept records of what is actually being accomplished will go far toward putting the fruit industry on a solid foundation and toward overcoming the idea that it is a risky business because of the perishable nature of the product.

There is a risk involved in every commercial transaction, but the fear of apples spoiling in transit or in the hands of brokers and selling agencies has perhaps been one of the principal reasons why they have not heretofore been regarded "as good as the wheat." Yet I presume that if the percentage of the crops produced which has actually been lost was published and compared with the percentage of loss in the

banana industry it would be too small to be noticed. I think you ought to cackle a good deal about this. You know when you say "eggs" everyone thinks of hen eggs, yet the duck egg is just as good and twice as large. The difference is the hen cackles and the duck doesn't. Perhaps the banana industry, which is quite firmly established, is the hen and the fruit industry is the duck—which ought to wake up and advertise. I am a strong believer in printers' ink and the white light of publicity, and believe that the men engaged in the fruit business ought to take advantage of every opportunity offered to educate the public to the value of the Big Red Apple as a food product, to the end that the variety of uses to which it is adapted may be better known and appreciated and its consumption increased and your markets consequently widened.

I venture the guess that the average American family makes a great many more daily purchases of bananas, shipped from the tropics, perishable as they are, than of Northwestern boxed apples. When you have a firmly knit-together selling organization covering the entire United States, with a perfectly organized distributing system which makes the sight of your apples at every fruit stand and grocery store quite as common as the sight of oranges and bananas, so that it is as easy for the shopper to get a sun-tinted apple a day to keep the doctor away for every member of the family as it is for him to get the sun-kissed oranges, and when by educational advertising you have taught him to think in terms of apples as he now thinks in terms of bananas and oranges you will have, without reference to export markets, a demand which will go far toward absorbing your output and allaying the fear of overproduction, even with all the orchards in bearing, of the many that have been planted, which will ever see the productive stage. This fear of overproduction and the uncertainty of your limited markets, as well as the fear of decay in transit, is largely responsible for the unfavorable light in which the fruit industry has heretofore been held by a great many people.

It is a well-known financial maxim that "The higher the rate of return the greater the risk involved." Here, again, the big returns of the banner years in the infancy of the fruit industry have acted as a boomerang to discredit the industry to some extent in the minds of financial men, who, before committing themselves to support the marketing of the fruit crops, wanted to be shown the sureness of your markets in the big-crop years and the sureness of the percentage of returns in the poor-crop years. The man who has gone through the ups and downs of the business for several years and has records to show that he did not become over-intoxicated with success in the good years, nor had his heart broken in the poor ones, is now, in my opinion, in a better position to talk "turkey" to his banker, when he needs assistance, than ever before.

The industry is yet new, comparatively speaking, and while there is yet a great deal to be done much has already been done toward solving your problems and placing the industry upon a proven basis, and it is quite refreshing to take stock of the progress made, just as when climbing up a long hill it is refreshing to occasionally stop and look back to see how far you have gone.

If you will contrast present marketing conditions with what they were a few years ago when the commission men and consignment houses had it all their own way, you will certainly have cause to congratulate yourselves upon your good judgment in the organization of your co-operative selling agencies. Necessity perhaps mothered this invention and forced you to get together when it was every fellow for himself and the devil wasn't very far from the heels of any of you, but you must not forget to give co-operation the credit due for what has been done and stay together for all time, despite any and all petty jealousies which are so apt to creep into organizations of this kind.

No doubt some mistakes have been made, and others will be made, so long as you have only human beings to manage your affairs, and perhaps you have some men in your co-operative associations who are blessed with the spirit of criticism and can tell you of many things that have been done that ought not to have been done, and of many more things which have been left undone that ought to have been done—and, oh Lord, a thousand things that need fixing.

Russia today is a shining example of the handiwork of men, strong on destructive criticism but weak on constructive program; so before giving too much heed to the calamity howler and crepe hanger, perhaps it would be well to ask him for a well tried and proven remedy for the ills he so loudly bemoans.

Co-operative marketing associations, being institutions of your own creation, are just what you make them, and if they don't suit you it is up to you to help steer them in the way they should go. Their success or failure is absolutely up to you. The future of the fruit business in this country, in my opinion, entirely depends upon these institutions, and their success will be measured exactly by the measure of your hearty co-operation and support.

Based upon our observation and experience of the last few years, I should say, if asked to point out the principal weaknesses of co-operative selling agencies and prescribe remedies, that the chief faults are two—lack of capital to properly handle a task of such magnitude and a tendency to stray into other fields of activity than that in which they are best fitted to serve. Regarding the latter, while I am a strong believer in co-operation, I like to see it halt a safe margin this side of paternalism. I do not believe your co-operative association should attempt to do everything for its members and leave them nothing to do for themselves, any more than every member should at-

tempt to do everything for himself, unless we are to return to the pre-commercial age, when there were no specialists in any line, but every man used only that which he produced or fashioned with his own hands.

If the fruit growers attempt to establish not only their own lines of communication to all markets, but from all markets as well with an idea of eliminating all middlemen, then these middlemen will have to raise their own fruit in the back yard, and you will have to eat your own fruit. So, while I believe that you must hang together in your co-operative selling agencies or be hanged separately outside of them, I believe it is in the marketing of your output in which these agencies have been most useful and in which they are most likely to continue to be useful, rather than in co-operative buying of all the necessities of life, although there are doubtless some things of common use to all growers which can be purchased to advantage in quantity lots and satisfactorily distributed through the association to its members, such as spray materials; paper and boxes, but I believe that it would be poor business to attempt to cover too wide a field and take in too many lines of activity, if for no other reason than the enormous amount of capital required. Regarding the lack of adequate capital for handling the tasks you have assigned to your associations, I see no reason why the grower should hesitate to reinvest in the stock and surplus of these organizations some of the money they have undoubtedly saved him since their establishment. If he is afraid to do so and does not want to support with his own money, his own organization, which is supposed to be working for his own good and using the funds for his own benefit, then he should not criticize the banker for taking a tip from him and refusing to risk the bank's money where the grower is afraid to risk his, where the ratio of benefit is 92 to the grower to 8 to the banker. I therefore feel that after the capital stock of your co-operative organizations is paid in, every box of fruit passing through its hands should bear a tax equal to a small part of the increased net price the grower is getting by co-operative selling, to the end that a surplus working fund may be built to help take care of the increasing volume of business the association must do each year, and that your business at bank may be backed up by a combined capital and surplus capable of absorbing the occasional losses that are bound to creep into your business, just as they will creep into any other business involving the handling of perishable products and the extension of credit. This is equally true of the individual grower. He ought to at least set aside in a surplus fund part of the returns from the good years to absorb the shock of the poor years. These shock absorbers of capital and surplus in your business are quite as essential as springs and shock absorbers on your machine, and if you don't have them someone is going to get bumped when you hit the rough places

in the road. Your banker will be more willing to ride with you if you have them.

To sum up this somewhat rambling argument, I would say that with the progress that has already been made and is being made toward standardizing the grade and pack of Northwestern fruit, and the safeguards that have been put around the moving of it to market, it is quite possible to so widen the markets and increase consumption as to reasonably insure a ready sale of the output each and every year and place the industry on such a basis of sureness of returns as to make paper arising out of the commercial transactions involved in the marketing of the product quite as attractive to banks as the paper of various other industries now freely circulating through trade channels.

Keep in mind that it is products rather than prospects that must back up a loan, and that if you must have help when prospects are all you have you need facts and figures to demonstrate your ability to turn prospects into products. You must also be willing to tie your product to your paper and let it follow through to market, so that when maturity date arrives the automatic self-liquidating power will be also present.

A beautiful method of operation covering this has been provided by the federal reserve act in the trade acceptance. The national bank act declared and the federal reserve act reaffirmed a preference for bills of exchange drawn in good faith against actually-existing values. The most acceptable form of such a bill of exchange is the trade acceptance, which, briefly, is a draft drawn by the seller of merchandise on the buyer, payable at a definitely fixed future date and accepted

by the buyer. This must be accompanied by evidence, or bear declaration on its face, that it arises out of a commercial transaction between the parties, involving the sale of merchandise, and in order to be eligible for discount at bank must be accompanied by signed financial statements of the parties showing satisfactory responsibility and a reasonable proportion of quick assets to current liabilities.

All the fruit growers must do to put their paper in this favored class is to be able to demonstrate to the federal reserve board that apples in warehouse and in transit to market are actual-existing values that are sure to continue to exist to the end of the chapter, and that the market is sure and steady enough to insure payment for the apples by the buyer upon arrival at destination, and that all parties to the paper are financially responsible and proper safeguards are employed for protection of the apples, such as warehouse facilities to avoid loss from freezing, proper cars for safely shipping and adequate fire-insurance protection, and perhaps a few other little things like that.

But believe me, all this, and more, is worth while, for the old days of haphazard jawbone style of credit are at an end, and the man who wants it now must be able to cite book, chapter and verse for the faith that is in him, or that he wants the banker to have in him; and the fellow who is conducting a farm or an orchard on a business basis, and has recorded facts and figures with which to illustrate his story, is more likely to get a respectful hearing and live happily ever after than the fellow who approaches the custodian of the long, green alfalfa from the "You know me, Al" standpoint.

The Labor Problem Among Fruit Growers

By Dr. Suzzallo, President University of Washington, Chairman State Council of Defense

THE State Council of Defense is aware of the great seriousness of the labor problem for the horticulturists. The last season was difficult because of a shortage in the labor supply and strikes. Since then there has been one complete military draft and another is coming about the month of April. In addition, the large growth of war industries in this state and in Oregon has drawn still further numbers from the ranks ordinarily available for agricultural labor. Still larger numbers will be drawn into industrial establishments the next three months. All this forecasts still further labor shortage. The situation is menacing and must be met because the food situation is crucial.

The policy of the State Council of Defense is to plan early to meet this situation. It has already held several conferences on the subject with government officials. Thus far its organized work covers the following points: First, the United States Employment Service, which is now established in a few places in this state without adequate co-ordination, is to be extended and co-ordinated under the supervision of

paid government officials. This machinery is being set up now for the shipbuilding industry's use this winter, and it can be utilized for the ranchers this spring and summer. We understand a Federal appropriation will soon be available for this purpose. Second, the public service reserve is now being organized to tap previously unused labor resources. The Council of National Defense has already issued suggestions for this work, and a state director has been appointed. The immediate co-operation of this organization will be with shipbuilding, but its mechanism will be turned over to agricultural needs as soon as the present crisis has passed. Part of its machinery is specially devised to aid the rancher.

The work will cover: The men's working reserve; the women's working reserve; the boys' and girls' working reserve. Each county will have a county director with two associates, probably some school official representing boys and girls, and one other person representing women. These county officers will work in direct connection with the United States Employment Service and will perform two services:



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Check and report labor needs to the United States Service; find available labor reserves among the men, women and youth of the county.

The Council, on the basis of the experience of last summer, recommends certain policies which have been of great aid during the difficulties of last summer. They are: Let every method of economizing labor be put into effect. This applies mainly to the grain farmers, where machinery can be used to economize labor. If any means of helping the horticulturists to economize come within their experience, these should be formulated at once and the information spread. Let every rancher get his primary labor supply from his family, relatives and friends, particularly those living in towns and cities. This will give a solid and loyal emergency corps, even though it may often be inexperienced and not fully efficient, and it will be a safeguard against labor agitators and strikes at the crucial moments when such difficulties interfere most. Let every rancher get his secondary labor supply from other people, strangers, who are nevertheless people with a stable domicile living in the

community or the county. If adequate wages and good living conditions are provided, these workers can be attracted away from other occupations less essential or in slack season. Let the tertiary labor supply come from the migratory labor class, which is least dependable at the present time.

The Council would suggest that the horticultural association take the initiative in considering the whole problem of the agricultural labor supply in this state. The procedure might be along the following lines: Have your association appoint a committee empowered to consult with the State Council of Defense and the U. S. Employment Service, and draw up a standard policy to recommend to the individual members of the association. Ask all the other agricultural associations to appoint similar committees. A meeting of the State Council of Defense and these association committees could then be called to discuss and formulate the whole matter. Mr. Rogers of Waterville, a member for farm labor in the State Council, would be especially glad to have this meeting I am sure.

When I consider how much the leaders of the various associations were able to help themselves and the Defense Council this summer on the fruit-box situation, I am sure of equally effective policy in dealing with this problem. There are two other problems that should be considered with labor supply: The question of good standard wage, so as to avoid merely taking workers from each other without drawing in the needed new workers. The problem of getting a special committee of farmers and sanitary engineers to plan a standard but cheap equipment for housing workers during the season. A great many city workers who were induced to go into the country have said that they would not return to the orchards next year because of the unsanitary conditions. Our experience is that this is a difficult problem to handle cheaply. The careless will make no expenditure and some will spend more than they need to get a good, standard living condition. In other ranches situated near a village or town, another method used is to devise adequate transportation facilities such as is done for consolidated schools transporting pupils.

A resolution was drafted, presented and carried as a motion that the executive committee of the Horticultural Association co-operate with the State Council of Defense in carrying out this program.

Planting Trees in Buckshot Soil

By C. H. Witherspoon, Arkansas

BUCKSHOT soil is not looked upon by horticulturists as very good orchard ground. As we desired to plant several hundred pecan trees in this type of soil and did not feel greatly encouraged as to the success of the project, if we planted the trees by ordinary methods, we decided to employ what was to us a new method of planting; that is, using dynamite to blast the holes.

We were very much pleased with the results. We found it to be much quicker and cheaper than digging, and what is more important, the dynamite broke up the soil nicely and made an ideal bed in which to plant. We used a half pound of dynamite for each hole, loading the charges in the bore holes about two and one-half feet deep. Very little digging was required to get the dirt out of the holes and prepare them for the planting.

In view of this experiment, I feel that I can confidently recommend dynamite for tree planting, especially in buckshot soils.

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Irregular Emergence of Codling Moth at Hood River

By Leroy Childs, Entomologist and Plant Pathologist, Hood River Branch Oregon Experiment Station

[Editor's Note.—The following observations on codling moth in Hood River, by Leroy Childs, entomologist in charge of the Experiment Station, during the years of 1914-15-16-17 will prove very interesting and valuable. It should be borne in mind very distinctly that the conditions refer to Hood River climate, which is very different from almost any other section in the Northwest, being subject to great changes and more variation in weather and generally cooler throughout the entire season. However, some very important facts are well established by Mr. Childs, as indicated in the article. It certainly seems important to call the fruit growers' attention in the Northwest in general to the fact that if the great variation at the time of the emergence in Hood River is due to climatic conditions it is quite likely that more or less variation occurs in other districts. The editor does not mean to say this is a fact, but it looks very likely. The damage from codling moth in several districts was very excessive in the years 1916 and 1917, particularly in 1916, with a heavy damage in 1917. It is the editor's impression that a great many have followed a set spraying program, spraying on the same dates every year. Possibly this is the cause of the severe loss. It is quite evident from Mr. Childs' investigation that, owing to the weather conditions, the continuation of the brood may cover a longer period. A great many fruit growers have believed they can control codling moth by three sprays. Investigation as given here is quite conclusive evidence that in some years in Hood River it will take four sprays, possibly five. It is also quite probable that the same conditions may prevail in other districts, and instead of three sprays being sufficient, four or five may be necessary to effect a satisfactory control of the codling moth. As before stated, the investigation of the codling moth in this article is confined to Hood River. It seems reasonable to assume that by reading this article the fruit grower in other sections of the Northwest will be put on his guard and will watch the development of codling moth more carefully. One other very important feature put forth in this article is that the average orchardist, for some reason, is frequently not able to determine the proper time for spraying for codling moth, and therefore it is suggested that every district that has not already a trained man to determine the proper time for spraying for codling moth would do well to make arrangements for putting in a sort of experiment station to carry on the work.]

THIS article includes a brief resume of the observations that have been made relative to the behavior of the codling moth at Hood River, Oregon, during the years 1914, 1915, 1916 and 1917. The work has been conducted for its applicable value chiefly in order that the local orchardists might be supplied with first-hand information on the seasonal progression of this insect's activities which would enable them to more intelligently and satisfactorily apply their lead sprays. Not being a major project the investigation lacks many details that would more clearly demonstrate the very wide seasonal variations in the life history of this apple insect from one year to another.

The two most important points that have been brought out in this study are, first, the very decided variation in the emergence of the broods from one season to another and its necessary influence on the timing and applying of sprays in order that control may be entirely successful. Secondly, the investigations indicate that sweeping recommendations given out often in the form of spring bulletins from a central or distant station are far from meeting the requirements in codling-moth control in the different apple-growing sections of the Pacific Northwest, where vast ranges of conditions are found at rela-

tively short distances. These ranges, due probably to temperatures varying on account of altitudinal, coastal and interior influences, are such as to warrant seasonal studies of the insect in the different sections in order that a comprehensive knowledge of the insect's activities be available for the use of orchardists in their control measures. Until such stations of study are maintained we can expect a great deal of trouble from the codling moth in the different apple-producing districts.

The variation in the life history of the moth, which influences the timing of sprays, has been found to be of more importance in the control of the second generation of worms than the first brood, as in the case of the latter, conditions which retard vegetative growth usually directly influence insect activity with a result the standard spring applications—usually a combination insecticide and fungicide—can under most conditions be effectively applied by following a prearranged spraying program.

The information gained and the points herein discussed have been obtained through yearly breeding cage studies and field observations of the different stages in the life cycle of the codling moth. Properly prepared and watched, the breeding cage can be used by the investigator as a good index for the successful timing of sprays in order to get maximum control. However, in the hands of the novice, particularly one who is not very familiar with insect life information gained from the cage can lead one astray. The writer has found some growers who can draw sound deductions, others the following of the information divulged would prove disastrous.

The breeding-cage information gained by the writer during the past four years has on many occasions proved decidedly perplexing, and was only of value when carefully weighed with surrounding general field conditions. As an example of this: In 1915 we observed several moths issuing in the breeding cages as early as April 27, due to the fact that about a week of very warm weather occurred at that time. This was followed by cold, rainy weather during the remainder of the spring. No more moths issued in the cages for nearly a month and no eggs were found until May 28. This is only one of many similar observations. When problems arise that puzzle the trained investigator—who can make deductions of value only upon considering the problem from all angles—the orchardist stands little chance of gaining more than approximate information at best. In the absence of expert advice, however, breeding-cage studies on the part of orchardists are to be encouraged. Its maintenance not only keeps them more keenly interested in habits and control but if carefully attended to serves as a very good indicator where developments are normal.

Breeding cages employed by the writer have been of two kinds: One a box 14x16x20, screened in on three sides by ordinary window screening, and the other the actual screening in of the trunks of apple trees which were known to be harboring codling moth; in order to insure a good supply trees were often banded before the brood left the fruit, following which the cages were attached.

For spring study of the insects' development, cages were always prepared and stocked with worms during the fall of the year. In so doing no unnecessary



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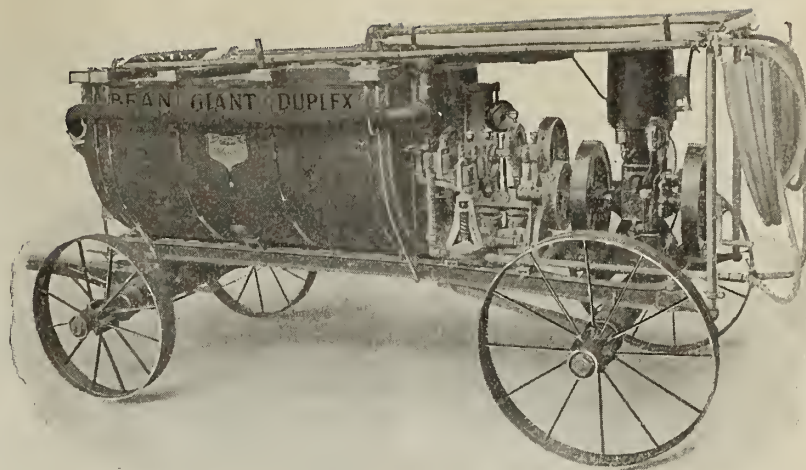
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stimuli, showing itself either in the form of increasing or retarding emergence, occurred. A much greater variation in the emergence of the moths has been noted where transfers from the tree trunks were made during the spring of the year. The mortality of spring transfers is also much higher, making it often difficult to gather accurate information. To facilitate the stocking of cages, trees are usually banded before the worms leave the fruit. Many of the insects establish themselves in the folds of the burlap which is used and transferred to the cage, without disturbing them if their cocoon has already been spun. Others can be readily removed from the trunk and be placed in the cages which have been provided with bark, chips and decaying bits of wood in which the larvae readily establish themselves. To determine development from some of the worms which have not suffered transferring, worm-infested apples are placed in the cages; these are removed as soon as the worms have left the fruit.

The cages are distributed throughout the valley at different altitudes. Commercial apple orchards are found at heights ranging from 100 to nearly 2,000 feet. The average seasonal variations in the two extremes given has been found to be from fifteen days to three weeks for the first brood and about ten days for the second. In the emergence of the first brood a very definite progression from the lower to the higher elevations occurs; it is much less pronounced for the second, due probably to the fact that summer temperatures during the day at least are more nearly uniform throughout the valley than are the spring temperatures.

As near normal orchard conditions as can be determined are taken into consideration when establishing the cages. This particularly refers to sun exposures, wind and rain that emergence may be as nearly uniform to the surrounding orchard conditions as possible. As far as time has permitted breeding-cage observations and notes have been checked against field observations.

In comparing the dates of emergence of the moths of the first brood over this series of years there occurred a variation of a full month and a half. A record was not obtained in 1914, but in 1915 the first moths issued in the cages on April 27. In 1916 this phenomenon occurred on May 26 and in 1917 on June 15. The question that immediately presents itself is: What factor or group of factors is responsible for that very marked variation. A study of the existing weather conditions during these years assist to a large degree in supplying the answer.

Owing to the fact that the writer did not arrive in Hood River until the middle of July, 1914, observations were not taken relative to the weather conditions during the early season. However, a study of the daily weather report indicates that the temperatures for April, May and June for this year were exceedingly mild. The mean average temperature being much higher than in any of the other three years under con-

sideration, and is largely due to the fact that the average minimum temperatures were uniformly higher during the three months. The result was that codling moths issued in large numbers early in the season. This was followed by favorable weather conditions for egg deposition and hatching. Mr. G. F. Moznette, who made observations at Hood River on the activities of the codling moth during the spring of 1914, found eggs hatching in large numbers in several orchards on June 5. On this date many of the worms had entered the fruit. Summer weather during July and August continued favorable for development. The first worms were found leaving the apples on June 24; pupae were noted on July 7 and moths emerged July 19. On July 27 the first eggs of the second brood were found on the fruit. The station gave out at this time notices for growers to begin their spraying operations for the control of the second generation of worms.

In 1915, during the months of April, May and June, there was much more fluctuation in the daily temperatures than in the corresponding time during 1914. The average maximum temperature for 1915 was practically the same as for 1914, but the minimum temperatures were very much lower. In 1915, due to this fluctuating daily temperature, breeding-cage observations seemed of little importance when correlated with timing of sprays for the control of the first generation of worms. The latter part of April and the first few days of May were very warm, resulting in the emergence of numerous moths in the breeding cages on April 27 and the days immediately following. At the time the calyx spray was being applied in an orchard in which the writer was carrying on experimental work many moths were flushed from the trees when the spray was thrown into the foliage. Following the 6th of May and continuing throughout the remainder of the month rainy, cold weather occurred. The influence of these conditions not only prevented emerged moths from depositing eggs, but checked—practically stopped—emergence which had begun on April 27. Eggs of the codling moth were not found until May 28, one month after the emergence of the first insects. These were found plentifully during the month of June and early in July. The first hatching eggs were noted on May 31. The average maximum temperature during July was about six degrees below normal, which apparently retarded the development of the insects during this time. The first moths of the second generation issued July 26 and eggs were first noted August 10, fourteen days after the egg hatching of 1914. Growers were advised to have their spray on by the 12th, or fifteen days later than was recommended the preceding year.

The year 1916 proved to be one of more irregularities in the habits of the codling moth than of any ever previously studied by the writer. Spring and summer seasons were very far from normal. The spring and early summer was cold and accompanied by many rainy days, and late summer, though

fair weather prevailed, at no time did it become warm. The first moths issued in the breeding cages May 26, or at practically the same time eggs were present on the trees during the two preceding seasons. Emergence of moths was at its height between the 6th and 15th of June. On June 10 the first eggs of the season were observed. Beginning with the 17th of June (at which time egg deposition should have been at its height) rainy-weather conditions set in, which continued until July 4. During this time temperatures were very low, there being only five days during this period at which time the thermometer registered above 60 degrees at sunset (the theoretical minimum temperature required by the codling moth for the deposition of eggs). Of these five days, three registered 62 degrees. Eggs of the first generation were found present on the fruit as late as the 8th of August, but at no time during the summer were they numerous.

Moths of the second generation were found for the first time on August 18, exactly one month later than in 1914 and twenty-two days later than in 1915. But very few second-brood moths appeared in 1916; for the most part but one generation occurred. This definite statement can be made due to results of breeding experiments conducted to determine this point. Those worms which resulted from eggs deposited prior to the cold, rainy weather which extended from June 16 to July 4 produced second-generation insects; those insects resulting from eggs deposited following this cold period failed to undergo any changes after they left the fruit and remained as larvae on the trees until the spring of 1917.

The year 1917 was productive of still different irregularities in codling-moth behavior. The past season has been one accompanied by heavy losses in many Northwestern apple-growing sections due to the great numbers of worms. Hood River was apparently more fortunate than most of the sections in this respect, but nevertheless losses resulting in a good many orchards were serious.

In 1917 the early season was very backward; March, April and May were quite cold, accompanied by many days of rain. This prevailing condition had a very marked influence on plant development; leaf buds on the apple trees did not begin to burst till the first of May. At this time during the years 1914 and 1915 the petals were falling, followed shortly by the calyx spray. Even after this late date foliage development continued to be very slow owing to the continued low temperatures. The average maximum temperature for the month of May was but 62 degrees. A temperature of 70 degrees was not reached until the last day of the month. With the arrival of June weather conditions changed; continued warm, settled weather following June 4. The first moth, however, did not emerge in the cages until June 15. This observation was checked up with orchard conditions during this period and no moths found to have issued under field conditions up to this time. This date was

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**A box of small apples costs less and
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**Every dinner pail should contain an
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**Sharpen your tools in the winter and
have them ready when the spring
work begins.**

**It is wise to overhaul and clean the
spray outfit.**

**Be sure the spray outfit is in first-class
condition in advance of the spraying
season.**

Spraying.—Last year weather conditions were especially favorable, consequently the growers had very little fungus. However, codling moth was serious. The growers who followed the spraying program, spraying in the right way at the right time, had comparatively little loss from codling moth. Those who did not suffered severely. The aphids in 1916 caused a heavy loss; in 1917 the loss was much lighter. The loss from San Jose scale and the damage done to the trees, which is always more or less prevalent, makes it nec-

essary for the grower to watch his orchard very closely. If any scale is present the orchard should be sprayed. To sum up briefly—because one season a man suffers very little from any pest or diseases he must always bear in mind that next year the conditions may be favorable to the development of diseases or pests, consequently the only one safe method is to follow the spraying program, omitting none of the sprays for any of the diseases or pests that infest orchard communities. One word more of caution seems advisable, that is in reference to the spray materials used. There are a sufficient number of good makes of arsenate of lead on the market so there is no reason for a fruit grower to take any chances on buying an unknown brand or a brand that is questionable.

Advertising the Apple.—"Good as an apple in the box" should be made a slogan, and it should be made just as effective and just as strong as "Good as the wheat." "Good as an apple in the box" can be brought about by superior product, packed absolutely according to standard grades, careful handling and being placed on cold storage early in the season promptly after packing, so that none of the life of the apple has left. Under these conditions, with proper demand and satisfactory values, then the fruit grower will be entitled to say when asking credit, "Good as an apple in the box." This demand can be created by proper salesmanship, proper publicity, wide distribution. Every other well-known mercantile commodity that we use, eat or wear, that is extensively sold, has an established reputation brought about through advertising and salesmanship, coupled with quality. There is no question about the fact that advertising is one of the great big factors in increasing the demand for a first-class commodity. Illustrations are too numerous and too well known to mention them in detail in regard to general commodities, but it might be worth while to call the fruit grower's attention to a few publicity campaigns that have been carried on in connection with the fruit industry that have proved extremely successful. By advertising, the Sunkist orange has created an immense demand that consumes 50,000 cars a year, whereas 1,400 cars a few years ago was considered an oversupply. Sun Maid raisins have raised the raisin industry of California out of stagnation and put the business on a proper paying basis. Bananas a few years ago could only be had in a few of the large cities. By the greatest salesmanship ever carried on a demand for bananas has been created and bananas are now sold in every city and every village in the United States. The advertising carried on for Skookum apples by the Northwestern Fruit Exchange has been a big factor in securing satisfactory prices. The advertising campaign carried on by the Hood River Apple Growers' Association on the Blue and Red Diamond brands has shown splendid results in establishing these brands and has been a big factor in selling them at satisfactory prices.

The advertising campaign carried on by the Yakima Valley Fruit District Growers' Association with the big "Y" brand during the year 1917 has been of great value in creating a reputation and a demand for that brand and increasing the consumption of apples. Loganberry juice was little used and seldom heard of until this delightful drink was given publicity through the advertising of Loju. Comparatively little cider was drunk until in the last year or two and now cider is being sold extensively, one of the popular brands being Appleju. The Pheasant Fruit Juice Company of Salem, Oregon, by advertising and publicity coupled with good salesmanship, built up a splendid business on their fruit juices.

Loss From Wormy Apples.—Does it pay to omit one spray? Emphatically no, even though the cost of spray has advanced. Just take a piece of paper and do some figuring on the cost of spraying, the value of a crop of fruit, and the damage from worms. If you are not handy with figures consult the information contained in the table prepared by Mr. S. W. Foster appearing elsewhere in this edition. If the loss is 3 per cent, at \$1.00 per box, and the crop averages 300 boxes per acre, the loss will pay the cost of spray material of four sprays at 300 gallons to the acre for four times. Every grower will admit that 3 per cent is a small loss, as many growers lose 10 or 15 per cent, and growers understand fully, in addition to this, that there is an extra loss from healed-over stings which are worth less in value on account of having to be packed in lower grades. The editor advises all fruit growers to give the matter a little thought and a little study and to do a little figuring, feeling sure if they will do this they will omit none of the sprays or fail to spray thoroughly.

Fruit Growers' Associations.—The fruit growers' association is expected to do two things for the fruit grower—sell his crop at satisfactory prices and furnish him the necessary supplies, such as boxes, paper and spray material. To do the latter, especially, requires capital, more so now than ever before, when the time limit on credit is being shortened on account of war conditions. Therefore it is more important for the fruit grower than ever before to help create a surplus for his selling organization. A small amount per box in a few years will build a splendid surplus. Fruit growers should not hesitate in being willing to contribute to this surplus—in fact it is a necessity. Goods that are bought must be paid for. A small amount per box of one or two cents per year will soon build a splendid surplus in a very few years. With good equipment in the way of warehouses, cold storage plants, etc., paid for, or being paid for, and a good surplus, an association is in a position to borrow money, but if the fruit grower is afraid to contribute to this surplus how can he expect the bank to have sufficient confidence to be willing to advance money to the association.

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With patent Automatic Pressure Governor, has all the desirable features found in any Spray Pump, viz., vertical cylinders, renewable brass valves and seats, large stuffing boxes fitted with brass glands and followers, large air chamber, machine cut gears, ample crankshaft and connecting rod bearings, etc. In addition it is fitted with a patented Automatic Pressure Governor which eliminates the trouble-causing relief valve, and briefly, has the following advantages over the ordinary construction. Safety—Pressure relief is not dependent on the operation of a sluggish or defective relief valve. Uniform pressure regulation—The governing mechanism is not exposed to the clogging or corrosive action of the spray liquid which always effects the operations of the relief valve. Elimination of unnecessary wear—Plungers and valves are in action only when spray material is passing through the nozzles.

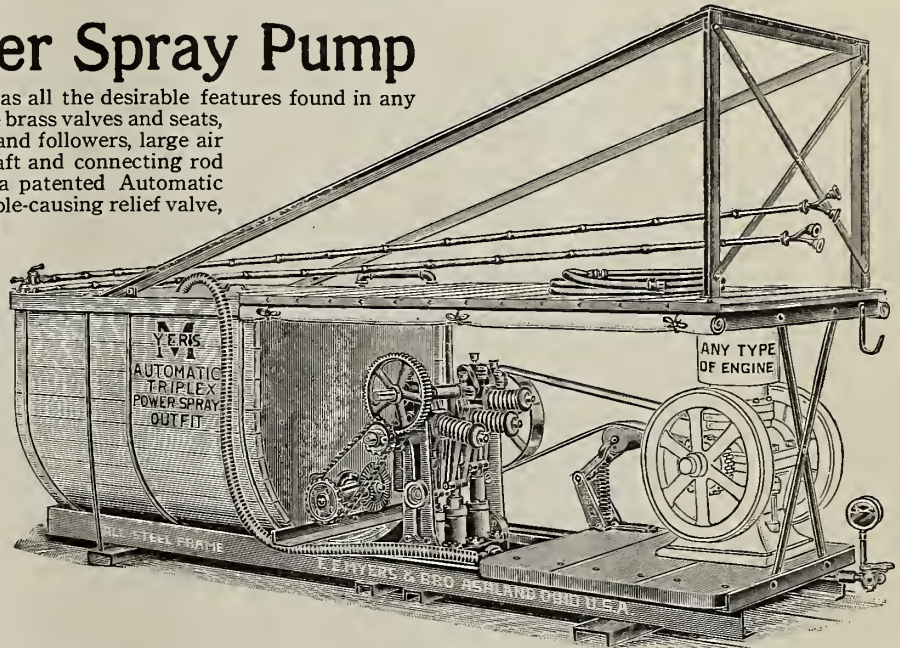
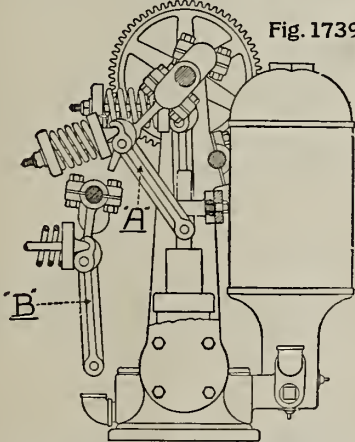


Fig. 1739



"A"—Position of Plunger Connecting Rod unlocked from crankshaft while not pumping.

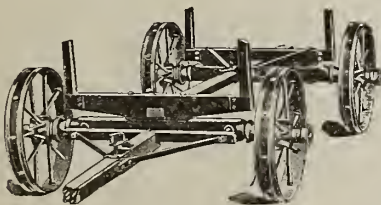
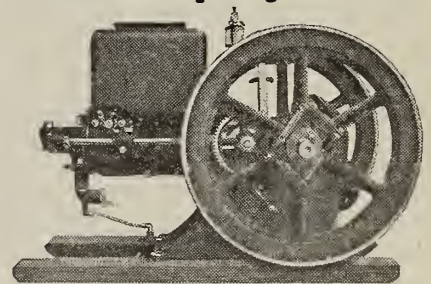
"B"—Position of Plunger Connecting Rod locked into position while pumping.

In operation the Automatic Pressure Governor has for its object the positive control of the pump pressure. This is accomplished by a simple arrangement of a combined lever and spring on each plunger connecting rod. [See A and B, Fig. 1739] which, when the pressure reaches a predetermined limit, automatically stops the operation of the plungers without interrupting the driving power, and again permits them to resume operation when the pressure falls below this limit; also removes the entire load on engine causing it to run idle [saves gasoline]. All wearing parts thoroughly lubricated.

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Selling the Apple Crop.—A few years ago a prominent banker informed the writer that it was a well-established fact the wheat farmer who sold his wheat at harvest time made more money than the farmer who speculated by holding his wheat. It seems there is a mighty good reason to believe this is true in regard to almost every product that the farmer or fruit grower produces. It certainly seems to be true in the fruit industry, especially apples, as it is true in reference to wheat. There is an occasional year when late prices show a considerable advance over early prices, but when the loss in condition, the loss in claims and repacking charges are figured it is the editor's opinion that the fruit grower is no better off than if he had sold early. Taking it all and all, on the average five or ten years, there is no question, in the editor's opinion, but what the fruit growers do well to sell extensively at harvest time.

Spray Outfits.—Every grower who has an orchard should own a spray outfit, but what is equally important, he should own a first-class spray outfit. If his old machine is out of date and partially worn out there is only one safe course to pursue, that is to buy a new one. When you buy a new one be sure to buy one that you know does effective and satisfactory work.

Irregular Emergence of, etc.

Continued from page 13

extra moth-spray suggestion, the application of which was given out for September 5.

At this point the question might be asked whether it was not a partial third brood of insects which caused the deposition of eggs found late in October. A series of the earliest-matured larvae of the second generation were caged and their activities watched during the remainder of the season; in not a single instance did pupation occur. A study of this character has been conducted during some of the other seasons, but up to the present time no indications of the occurrence of a partial third generation has been observed at Hood River.

As a general practice in the past in most of the sections of the Northwest spraying for the control of the second generation of worms has been supposed

to be necessary between the 25th of July and the 1st of August. This was the belief of local orchardists at the time the writer began the study of this insect in Hood River. In 1914 the study checked up nicely with these suppositions; the 27th of July being the time recommended for spraying. In 1915 the spray was applied most effectively August 12; in 1916, where it was necessary, August 28; and in 1917 on August 12. In two years out of the four the recommended date for applying the summer application of arsenate of lead was the same; with the extremes there was more than a month's difference. Those of you not entirely familiar with codling-moth control might ask the question: What material difference would it make if the spray were applied even ten or twelve days before egg hatching? The answer would be in terms of obtainable results; in ordinary seasons of infestation the difference between complete control as against one-half, or even less, control. In other words, an application of spray cannot be completely effective during a period not to accede twenty days at this time of the year owing to the rapid growth of the fruit and its necessary partial uncovering. If a spray is applied ten days in advance of the brood hatch, one-half of its complete effectiveness is forfeited at the time the application is made. Effectiveness in codling-moth control rapidly decreases at the end of twenty days. Egg hatching, on the other hand, under normal conditions, is usually approaching its height ten to twelve days following the hatching of the first eggs. At this time, then, a maximum need for protection is demanded and the effectiveness of the application of spray is rapidly decreasing. A large percentage of the losses that result and poor control obtained on the part of orchardists can be traced to this source.

The reduction of time of application of a spray to the shortest safe period preceding egg hatching will only be productive of good results. Very close timing, in the case of protracted egg hatching, will often save an extra application of spray and much unnecessary expense. To accomplish this end it is necessary to obtain a very intimate knowledge of the insects' seasonal behavior and demands a careful investi-

gation in the different sections by a thoroughly competent investigator.

It is the belief of the writer that the losses due to the activities of the codling moth in the Northwest can only be reduced to the minimum through the establishment of observation stations in the widely-separated apple-growing sections. An investigator located in some of these sections during the past year could have saved his community enough to maintain a station for at least twenty-five years.

Steinhardt & Kelly, who have always been a big factor in handling Northwestern box apples, is one of the firms that is not only progressive, but great advertisers and great believers in publicity. But even in the rush of their big business season they never forget their many friends or the people with whom they have done business, one of the last evidences being a large thermometer, about eighteen inches in length, which BETTER FRUIT desires to acknowledge, with many thanks, receipt of one of these thermometers, which is certainly very attractive and very useful in our office.

POSITION WANTED

By man who is not afraid to work. An experienced orchard man wants position as superintendent or foreman. Understands irrigation thoroughly; also stock raising and truck gardening. 18 years' practical experience. Can make good anywhere. Address

F. A. D., care BETTER Fruit

Foreman or Superintendent

Wants position on large ranch or orchard where he can buy home and small tract of land. Thoroughly competent to handle place of any size. Have put several losers on paying basis. References furnished.

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We offer for sale a highly improved, well equipped, 70-acre commercial apple orchard in full bearing, located one-half mile from shipping point in Grande Ronde Valley, Oregon. This orchard has had the best of scientific care and is in splendid condition. It represents a profitable investment for a live man.

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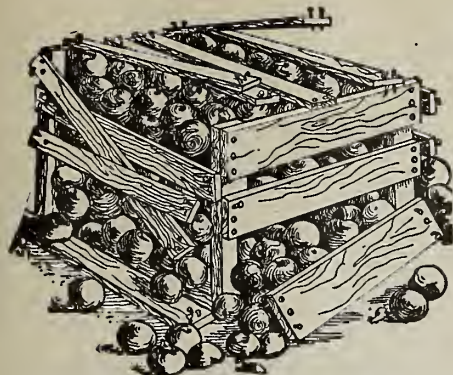
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Practically immune from frost, principally

Winesaps, Jonathans, Y. N. Pippins and Rome Beauties, with Elberta and Salway Peach fillers.

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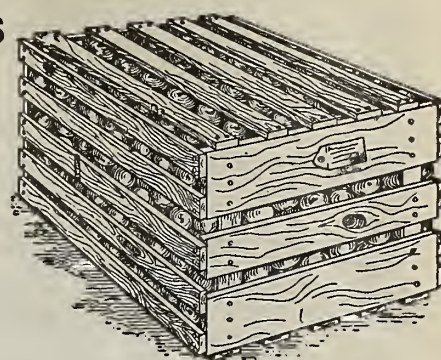
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Cement Coated Nails

Pruning Stone Fruit Trees

By Professor O. M. Morris, Horticulturist Washington Agricultural College, Pullman, Washington

THERE has been a great deal more experimental work done in pruning the apple tree than in pruning the stone fruit trees. There has been a good deal of helpful information written on the latter subject, and the work has not been without very careful study and observation, but very little careful experimental work has been recorded and published. Stone fruit trees are very regular and bountiful in their blossom production, and if the climate and soil permit the securing of a regular crop is assured. The trees have several undesirable characteristics. They have short lives, inferior fruit borne on old trees, and trees develop in such forms that fruit is out of reach and difficult to gather. Correct pruning practices have eliminated to a very great extent these undesirable features.

The fruit of the tree is borne on the side of the last year's season growth of wood. Very few fruits are borne on spurs, and the vigorous shoots, as well as the shoots of more moderate or even slow growth, will bear their normal crop of fruit. This distribution of the fruit makes it possible to control to a very large extent the amount of the fruit crop by the character of pruning that is given the tree in late winter and early spring. To cut away one-half of the fruit crop means that one-half of the length of last year's growth of wood should be removed. This may be done by taking away one-half of each twig, or by removing one-half of the twigs. If the latter process is followed, it means that more hand thinning must be done under ordinary circumstances to insure a crop of fair size fruit. On the other hand, if the crop is thinned by heading back the twig's growth over the entire tree top the results of a few years of such practice develops a bush rather than a tree, with an outside growth of wood that is very dense. The result is the death of a great portion of short twigs and stubs and an unsatisfactory development of tree tops.

The ideal peach tree is one with an open top or center so that the light may filter through, and some sunlight will reach the ground through the entire

tree top. The small twigs of the peach are not able to endure heavy shading, and when so enclosed in the top of the tree soon dies. The fruit borne on weak twigs are always small and inferior. The tree responds well to pruning, and renews its vigor quickly when severely pruned. The new crop of shoots sent out from previously developed or adventitious buds soon lose their watersprout characteristics and become normal fruit-producing branches. There is a much greater tendency in the peach than in the apple to grow only from central or leader

branches, and a much less ability to develop a vigorous but stocky side-wood material. It is often necessary to cut out branches from the center of the tree and open out the top, but this is seldom done with the idea of developing fruit throughout the entire head of the tree, as is done with apples and pears. One branch may be taken out of the tree top and let in more light. The following year, or within a short time, part of the remaining tree top is cut away, so that new shoots start nearer the base of the tree, and the

Continued on page 18

Arsenate of Lead Costs for Spraying Apple Orchards

Comparison of costs in paste form at average price in 1917, and at anticipated prices for 1918. Showing cost per acre and cost per box, according to production for three and four applications each season. By S. W. Foster, Entomologist for General Chemical Company, San Francisco.

Gallons of Spray per Acre Each Application	No. of Appli- cations	Tot. Gals. Spray Per Acre	Amt. Lead per 100 Gals.	Per Acre	Price per lb.	Cost per Acre	Boxes Per Acre and Cost Per Box		
							700	500	300
1917— <i>a.</i> 300	3	900	4	36	.09	3.24	.0046	.0064	.0108
<i>b.</i> 300	4	1200	4	48	.09	4.32	.0061	.0085	.0144
<i>c.</i> 300	4	1200	5	60	.09	5.40	.0077	.0108	.0180
<i>d.</i> 600	4	2400	4	96	.09	8.64	.0123	.0173	.0288
<i>e.</i> 600	4	2400	5	120	.09	10.80	.0154	.0216	.0360
1918— <i>a.</i> 300	3	900	4	36	.15	5.40	.0077	.0108	.0180
<i>b.</i> 300	4	1200	4	48	.15	7.20	.0103	.0144	.0240
<i>c.</i> 300	4	1200	5	60	.15	9.00	.0128	.0180	.0300
<i>d.</i> 600	4	2400	4	96	.15	14.40	.0206	.0288	.0480
<i>e.</i> 600	4	2400	5	120	.15	18.00	.0257	.0360	.0600

With a Crop of	Boxes Per Acre		
	700	500	300
1% wormy means a loss of....	7	5	3
2% wormy means a loss of....	14	10	6
3% wormy means a loss of....	21	15	9
4% wormy means a loss of....	28	20	12
5% wormy means a loss of....	35	25	15
10% wormy means a loss of....	70	50	30
15% wormy means a loss of....	105	75	45
20% wormy means a loss of....	140	100	60

Take for example an orchard sprayed four times, using 300 gallons per acre at each application, or 1,200 gallons during the season, and using 5 pounds of paste lead to each 100 gallons of water, or 60 pounds per acre during the season, and producing 500 boxes per acre. Two per cent of the crop at \$1.00 per box will more than pay for all the arsenate of lead used. If the orchard produced only 300 boxes per acre, about three per cent of the crop will be required to pay for the lead used in 1918.

Then consider the large trees, requiring 600 gallons of dilute spray per acre, or 2,400 gallons for four applications, and using 5 pounds of paste lead

per 100 gallons, or 120 pounds per acre during the year—less than four per cent of the crop will pay for the lead used, if the orchard produces 500 boxes per acre. If the orchard produces 700 boxes per acre, less than three per cent of the crop will pay for all the lead used.

For the man who thinks he may omit one or more of the late applications to save money, he should seriously and carefully compare the cost of the application with the cost in the loss of apples, if by omitting the application any of the apples may become wormy.

When we remember that one per cent of the crop will pay for the arsenate of lead used for one application, it is dangerous business to try to save expenses when the loss at the other end may be many times the amount supposedly saved. The difference between three and four applications is only about \$1.80 per acre for lead costs on the small trees and about \$3.80 per acre on the largest trees.

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MYERS SPRAY PUMPS

DISINFECT Your Henneries, Pig Pens, Barns, Sheds, Stables, Toilet and Closets with

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ASK Your Dealer or Write us Direct about Myers Cog Gear Easy Operating—Require 33% Less Power to Pump—Knapsack, Bucket, and Barrel Spray Pumps and Complete Spray Outfits for Hand Operation.

Myers Automatic—They Automatically Control the Pressure and Do Not Require a Relief Valve—Power Spray Pumps and Complete Power Spray Rigs for Extensive Spraying Operations in Large Orchards or for Custom Work. Myers Proven Nozzles and Fittings, Reliable Hose, and Spraying Accessories.

LATE Catalog, Showing Complete Line—Myers Bucket, Barrel and Power Spray Pumps, Nozzles, Hose and Fittings, for Every Spraying Requirement, and Giving Reliable Spraying Information, Spraying Calendar and Standard Formulae for Best Spraying Mixtures, Mailed Free to Anyone on Request.

F.E. MYERS & BRO. ASHLAND PUMP AND HAY TOOL WORKS.
No. 120 ORANGE ST. ASHLAND, OHIO.

Continued from page 17

outer and older wood growth is later removed. In this way the tree top is kept down within a definite limit.

Peach pruning is a comparatively simple process of pruning trees, although it requires careful judgment and thought, there is less difference of opinion about the systems than with the apples. The tree responds well to pruning, both in the production of new wood and in the healing of the wounds made by pruning. There is a great tendency in pruning peaches to do the work rapidly and carelessly, leaving stubs as an invitation for disease to take hold of the tree. This invitation is usually accepted, especially on the larger branches, and in the smaller branches, the wood is killed back from the edge of the wound, usually in a greater area than is true with many other plants. However, the pruning process that can be practiced on peaches does not of necessity weaken the vitality of the plant and is a necessity for the maintenance of the production of satisfactory crops of good fruit.

The apricot can be pruned very much the same as the peach. The trees grow

in very much the same fashion. It bears more fruit, however, on spurs, and also bears a large proportion of its crop on the side of the last year's twig branches. The same general type of tree and general method of pruning can be practiced on this plant. It is, however, very susceptible to ill effects, age of wood, and good fruits are seldom produced on old woods. In apricot-growing sections, it is a very common practice to head back very severely, sometimes to the extent of dehorning, and losing one or two crops on the trees, for the sake of renewing the top. But it is profitably done. There is a strong tendency in the apricot to develop only a few terminal buds on the strongest branches, and for these few to make all of the wood-lengthening growth of the tree. This tendency unchecked by cutting back produces the tree top composed of several long poles with only a few very small twigs and short spurs for fruit production. The life of a spur varies from two to five years in extreme cases. It does not average above three years, and the largest and finest fruit is produced on the one and two-year-old spurs and on the side of the vigorous, growing

branches. The trees are vigorous and grow rapidly, but are generally short-lived. The young trees respond to pruning and cover the wounds well, but the old trees do not. It is generally better to grow a new orchard than to attempt to rejuvenate an old one.

The American and European varieties of plums require very little pruning. The dead branches should be cut out and the strongest shoots cut back. The top is often thinned out like peach trees. The Japanese plum grows and fruits very much like apricots and should be pruned in about the same way.

The prune trees belong to the European plum class, and while they require comparatively little pruning, that pruning should be regularly done, and should be severe enough to prevent the formation of long and drooping branches. The general growth of the tree should be in an upward direction, and should be of stocky, vigorous wood. This tree has a good ability to renew its top with watersprouts when severely cut back, and good progress will be made if such work is done. This tree is able to care for its wounds in good shape, and if the wounds are reasonably cared for it is very seldom that rot gets started into the heart of the trees through such openings.

The sweet cherry bears most of its fruit on the side of small spurs. The blossoms are produced from buds on spurs of the previous season's development. Spurs more than one year old often produce fruit, but the blossom bud is produced on the growth of the

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THE NIAGARA DUSTER

The Labor Saver

**Use Only Niagara
Dusting Sulphur
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Dusting Mixtures**

They have been PROVED and approved by those who have made a success of dusting.

A leading fruit grower of White Salmon Valley (Washington) says: "It took three men fifty hours to apply one spray of liquid in my orchard, while two of us DUSTED it with equal thoroughness in eight hours."

Reports like these come from Hood River, Yakima, Wenatchee and every place where the Niagara has been used.



The Niagara Dusting Machines

WITH

**NIAGARA
DUSTING
MATERIALS**

are responsible for the

**Success of
Modern Dusting**

They make possible the best DISTRIBUTION in the most effective form.

**Niagara Dusting Machines
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Are distributed from
supply stations at

**Oakland, Los Angeles
and Portland**

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Use Niagara Soluble Sulphur for Dormant and Spring Spraying

previous season. A few rudimentary leaves are borne in each winter blossom bud, and each spur bears its own terminal leaf bud. Fruits are produced also from winter buds on the side of the previous season's growth of twigs, but these form a relatively small proportion of the cherry crop. The sour cherry, however, very commonly bears a large proportion of its crop from these side buds of the twig and branch growth. The sweet cherry tree is ordinarily a very vigorous grower, as the young trees, and even in middle life. The young trees grow very vigorously and very tall. Constant cutting back and heavy pruning appears to simply extenuate this characteristic. Ordinarily the best process of handling the tree is to so modify its tillage and general cultural condition that a smaller amount of stimulus is given to wood production and to encourage the coming into fruit production at an early date. As young trees they can be handled more nearly the same as pear trees than any other of our fruit plants. After fruit production is begun the trees normally assume a broader and more open oval type. However, the general tendency of the tree is to grow very tall, making the fruit picking a very difficult task unless very great care is exercised to keep the trees down within reach of normal operation. This plant is not able to endure heavy shade, and the small fruit spurs become weak and unproductive if severely shaded, and

will bear irregularly or only one or two crops and then die. The best process is to cut back and prune out the top constantly so that the fruit spurs may be productive for a period of three or more years. The general plan of operation would be to so prune the tree in its early life that a good framework from three to five main branches will be formed, and that in later life this can carry a load of well-distributed wood. Constant cutting back and thinning of the tree top is required. This plant can be pruned more to suit the ideal of the pruner or grower, and still have good results, than can the peach tree. The most difficult point of the work appears to be for the average grower to make up his mind that the tree will endure pruning. After he has fully satisfied himself on that, the general type of the tree that he has and the type of the tree that he knows he should produce will normally solve to a very large extent the type of work that should be done. The tree responds well to pruning, being invigorated by it, and the general character of the fruit crop produced is improved. The wounds made by pruning usually heal over well and seldom result in any disease or trouble to the tree.

Sour cherries are very frequently entirely neglected and not pruned at all. In fact, it is frequently advocated that they require, or need, no pruning. The facts are, however, that they respond quite as well to pruning as most of our other fruit plants, and in careful or-

chard work it is a profitable operation. The plants can be pruned very much after the same fashion as the peach tree, although it requires less vigorous work.

In all of the stone fruits the plants have a normal capacity to reproduce their new tops after the old is cut away, particularly if this cutting back has not extended into wood more than four or five years old. The same general principle applies, however, to these plants as to others. That the influence of pruning extends only a relatively small district from the part pruned. Pruning one side of a tree does not ordinarily directly nor indirectly affect the development of the other side. The stimulus developed from cutting off a branch is seldom distinctly noticeable more than three feet from the point at which the cutting was done.

In the treatment of wounds on fruit trees, it may be worth while to state that paint and washes are seldom necessary or advisable. About the best paint that can ordinarily be used is some antiseptic material. A good, heavy coating of lime-sulphur or bordeaux mixture, or a solution of corrosive sublimate is probably as good as can be used. In the pruning of most of the stone fruit trees, less care is exercised generally than in the longer-lived trees. The work is done more rapidly and more frequently in a sort of cut-and-slash method. Rapid work should not be discouraged, but careless work should always be discouraged.

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Drink a cup of Ghirardelli's Ground Chocolate every day in place of more expensive foods. Ghirardelli's Ground Chocolate is made of pure cocoa and sugar, the two great nutrimental foods, and blended in the right proportions to insure its distinctive taste-appeal, its easy assimilation and unusual nourishment. A tablespoonful, 1c. worth, with milk added, makes a cup—a true conservation food beverage.



Ghirardelli's Ground Chocolate

Comes in 1/2-lb., 1-lb. and 3-lb. sealed cans.

D. GHIRARDELLI COMPANY

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San Francisco

Banking the Fruit Crop

THE article by Mr. J. J. Rouse, cashier of the Fidelity National Bank, Spokane, appears elsewhere in this edition. It is the most valuable contribution by a banker to the fruit industry that has ever appeared in print. Every fruit grower should read the article, re-read it and carefully study it. The editor of BETTER FRUIT has made a few extracts, not in the writer's words, but somewhat condensed, of a few the most important facts and advice.

A new phrase, "Good as an apple in the box." Standardizing the fruit product so that "Good as an apple in the box" will mean "Good as wheat."

Do not judge the fruit industry by occasional years of good prices, but take the average to size up the business.

Your banker will not be influenced in granting credit by one year's good results—it is the average he wants. A well-kept set of books showing the annual income and expense will create confidence with your banker.

The production of food is the biggest industry, but less is known about it from accurate bookkeeping. Not one farmer in five hundred knows the average cost of production and selling price for a period of five years. This applies to fruit growers as well.

All are agreed that the farmer (fruit grower) gets skinned, but there are no figures to prove it, other than the fact he has not much left. Perhaps if he kept books he would find he is making

a living and doing as well as the average other fellow.

Bookkeeping for the fruit grower is a simple business, showing the cost of production, different prices received and net gain or loss. Well-kept records in bookkeeping will put the fruit industry on a solid foundation.

Fruit growers should advertise. Duck eggs are just as good as hen eggs, but the hen cackles, the duck does not. This is advertising. The banana and orange people advertise—the fruit grower of the Northwest does very little. The average American family buys a great many more bananas and oranges than Northwestern box apples. When the Northwest is knit together with good selling organizations and proper distribution and proper advertising so that it is just as easy for the consumer to get "An apple a day to keep the doctor away" as it is to get sun-kissed oranges, then a demand will be created, which will go far toward allaying fears of overproduction.

The fruit grower who has gone through ups and downs, who is not intoxicated with success of the good years or broken hearted over the poor years, is in better position to talk "turkey" to his banker when he needs help than ever before.

Co-operative marketing associations, the fruit growers' own property, are what the fruit growers make them. If they do not suit you it is up to you to correct them. Their success or failure is up to you. The future of the fruit industry in the Northwest is entirely

Trees and Shrubs

Prune, Cherry, Apricot, Pear, Apple and Peach in all the staple varieties, besides small fruits, etc. Buy now.

ROSES—Over one hundred varieties. Two-year hardy field grown.

SHRUBS—Of the favorite kinds, such as Spirea, Althea, Deutzia, Lilac, Hydrangea, Snowball, Weigela and many others.

SHADE TREES—To suit every need.

Vrooman Franquette Walnuts

Both second generation and grafted. The proven hardy nut for Northwestern conditions.

Our stock is grown on clean new volcanic ash soil in the heart of the Yakima Valley. It is free from disease or pest, stocky, splendidly rooted, fully matured. It is well grown, carefully packed and delivered to customers all charges prepaid, backed by our guarantee as to genuineness, quality and condition.

For fifteen years we have served our customers with first-class stock. Our field work is in charge of a Nurseryman with 40 years' experience.

Write us for prices.

Washington Nursery Company
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Great Little Tractor for Orchards

A Masterpiece of Simplicity
with Patented Front Drive
Send Now for the Book

Horses are 143% higher than during past decade. Feed is 100% higher. Labor is more scarce. There's a double need now for tractors.

Don't take chances. Tractor material is becoming harder to secure and the demand for tractors is constantly increasing. If you expect to have a tractor this spring, order now for future delivery and thus be sure of getting this tractor. No other tractor meets the needs of orchardists like this.

Note these Features:

1. Pulls instead of pushes itself over the ground. All power goes to pull.
2. Can be "gee-ed" and "haw-ed" out of holes and soft places like a team.
3. Has full-power pull on turns as well as on the straight-away.
4. Turns clear around in a 10-foot circle (5-foot radius).
5. Plows or harrows as close up in the corners of fields as a team.
6. Plows as close to vines and trees as a team.
7. Goes under branches of trees that no team can get under.
8. Pays for itself in what it saves.
9. Light weight—3100 pounds—on long track surface. Less weight to square inch than man's foot.
10. Simple 4-cylinder automobile type engine. Burns engine distillate.
11. Runs stationary machinery up to 10 h.p. when not working in fields.

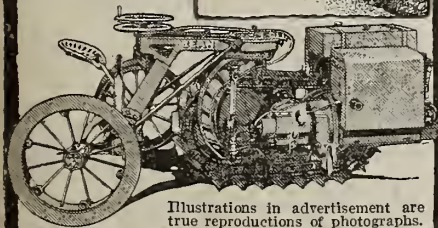
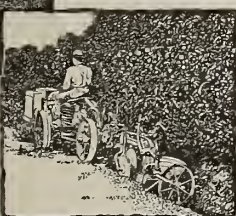
BEAN TrackPULL Tractor

Patented Front Drive



For Orchards
The Bean is built for
this kind of work.

Mail Coupon for Book
Send coupon to-day
for full information.
A few days' delay
now may mean doing
without this tractor
for another year.
Price NOW \$1215.



Illustrations in advertisement are
true reproductions of photographs.

BEAN SPRAY PUMP CO.
713 W. Julian St., San Jose, California
Please send me your Tractor Book with full information about the Bean TrackPULL Tractor.
Name.....
Street.....
City.....
County..... State.....

dependent upon these institutions. Their success, your success, will be measured through co-operation—your support.

The two principal weaknesses of co-operative selling agencies are, lack of capital and straying into other fields of activity. If the fruit grower attempts to establish his own line of communication direct to the consumer, eliminating all middlemen, the middlemen will have to raise their own fruit in their own back yards and the fruit grower will have to eat his own fruit.

The fruit grower should reinvest in his own association to create a surplus for carrying on the business part of the money the association has made or saved for him. If he is afraid to do so how can he expect his banker to do so?

With the progress that is being made in standardization and the safeguards being put into effect in moving the crop it is reasonable to expect a ready sale for output each year, and the industry will soon be placed on a sound basis.

Omission of the General Chemical Company Advertisement in the January Edition

FRUIT BETTER desires to say that it is with sincere regret, through an oversight in the advertising department, the advertisement of the General Chemical Company, which has been appearing regularly and will continue to appear for some time, was omitted in the January edition.

TENTH ANNUAL NATIONAL APPLE SHOW,
SPOKANE, JANUARY 14, 1918.

EDITOR BETTER FRUIT:

I want to thank you on behalf of the trustees of the National Apple Show for the splendid publicity you have given our institution in the January issue of your magazine. You are certainly a splendid friend to this institution and I want you to know how thoroughly we appreciate what you have done in this instance and also in the advance articles which you have printed from time to time.

When I agreed to accept the presidency of the Apple Show, I was told that I would find co-operation among the business men, fruit growers, and especially the publishers of horticulture papers. In this case this promise has certainly been more than fulfilled and I am frank to say, Mr. Shepard, that it has only been through the thorough willingness of everybody, like yourself, to do his share, that the 1917 show has been made a success.

I am told that in the years past you have always been a staunch friend of this annual exhibition, and it seems to me this is showing a fine, big spirit on your part to give such valuable publicity as you do.

Very truly yours,

JAKE HILL,
President Tenth National Apple Show.

SPOKANE CHAMBER OF COMMERCE.

Spokane, January 12, 1918.

EDITOR BETTER FRUIT:

That was a dandy layout you gave the National Apple Show in your January issue. I don't know how to express our appreciation because you have done the whole thing on such a magnificent scale that it is difficult to say just how we feel about it. You even put one of the cuts on the first page and, of course, added that much more to the usefulness of the story.

I distributed copies among our trustees and each and every one of them wanted me to try and express his appreciation of what you have done. However, it is the old story—Shepard always has come through and given the most valuable space to anything connected directly, indirectly or even remotely with the fruit industry.

I sincerely hope BETTER FRUIT will have a good year and that its good-fellow publisher will have more time to keep acquainted personally with his old friends this year.

Your sincerely,

REN H. RICE.



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ARSENATE OF LEAD
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This is one of the important materials used in spraying trees.

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Cheese Playing Center

Now that we are "doing sums" in short division with American food, we are ready to profit by the hard-earned war experience of Europe and her struggle on short rations. For instance, in Europe cheese is a very real part of the diet and not, as with us, the "something extra." However, with meat at present prices the American housekeeper thinks hard when told that cheese has about one and one-half as much muscle-building value as beef, pound for pound. She cuts out the "something extra," combines cheese with milk and eggs and makes a dish that rules out the roast, leaving beef for the soldiers and the Allies. Here are a few substantial cheese dishes that may be served sometimes instead of meat. They call for any hard commercial cheese, cottage cheese or the cheese like your grandmother used to make, now being revived in the farm kitchen:

Duchess Soup— $\frac{1}{2}$ onion, 2 tablespoons fat, 2 tablespoons flour, 3 cups milk, $\frac{3}{4}$ cup grated cheese, salt and pepper. Cook the onion in the fat until tender but not brown. Add the flour, then the milk gradually. Cook until smooth, add seasoning to taste. When ready to serve, put one tablespoon of the grated cheese in each plate and pour over it the hot soup.

Cheese Roll— $\frac{1}{2}$ cup rice, 1 cup milk, 1 tablespoon chopped onion and parsley, $\frac{3}{4}$ cup grated cheese or cottage cheese, $\frac{1}{2}$ cup mashed potato, pepper and salt to taste. Cook the rice in the milk with the chopped onion and parsley, then add the mashed potato, pepper and salt. Form into a roll, brush with fat drippings and brown in oven. This roll can be made up with many variations. Bread crumbs, beans and cheese may be combined, using enough of the liquor in which the beans were cooked to moisten the mixture so that it can be made into a loaf. The beans should be mashed. Still another combination is made by substituting for the beans spinach or chard chopped fine.

Cheese Fondue—1 cup milk, 1 cup bread crumbs, 1 cup grated cheese, $\frac{1}{2}$ teaspoon salt. Boil the milk and pour over the bread crumbs, cover and let stand on the stove fifteen minutes. Mix in the grated cheese and add salt and, if desired, a little red pepper or paprika. Pour into a greased baking dish and bake twenty minutes. A richer dish may be made by adding two or three eggs. Add the well-beaten yolks, then fold in the whites beaten until stiff. Bake thirty minutes in moderate oven and serve at once. This is really a souffle. Cooked rice may be used in place of the bread crumbs in making this dish.

Macaroni and Cheese—Besides the familiar dish of macaroni and cheese there are many others not so well known to the average housekeeper. Macaroni boiled in salted water drained and served with either grated cheese or cheese sauce is an easily prepared dish. Be sure that the macaroni is piping hot. Macaroni with cheese custard is particularly good. Place in a greased pudding dish two cups of cooked macaroni,



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Get our price list on all kinds of furs—muskrat, mink, skunk, etc.

FUNSTEN

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cover this with a cheese custard made as follows: Press through a colander or mash smooth one cup of cottage cheese, add one well-beaten egg, one-half cup of milk and salt and pepper to taste. Pour over the top of the macaroni and bake in a moderate oven thirty minutes.

Cheese Sauce—1 cup milk, 1 tablespoon cottage cheese or $\frac{1}{4}$ cup grated cheese, 2 tablespoons flour, salt and pepper. Thicken the milk with the flour. Just before serving add the cheese, stirring until it is melted. This sauce may be used on hard-boiled eggs, toast, cabbage, cauliflower, macaroni or rice. Double the quantity of cheese when it is to be eaten with macaroni or rice.

Wider Distribution by One Association

For several years the editor of *BETTER FRUIT* has carried on an aggressive campaign in an editorial and advisory way to increase distribution. In 1916 a number of articles appeared on this subject, causing a great deal of favorable comment and some criticism. It is a pleasure to note that the articles have had a wonderful influence in stimulating and increasing distribution. This is evidenced by the fact shown in November and December issues of *BETTER FRUIT*. In 1916, for a period of two months, the total number of towns shipped to were 611. In twenty days during the month of November, 1917, the distribution covered 550 towns, almost as much in twenty days in 1917 as in the sixty days in 1916. It must be borne in mind that in connection with this statement that more fruit rolled to diversified points this year than ever before, consequently the full number of towns is not shown, and during twenty days in November the number of towns exceeded the total number of towns shipped last year. A very significant and much appreciated letter has reached this office from one of the sales organizations through the courtesy of the sales manager. This concern up to the time reported had shipped about 500 cars of apples, distributed to 187 different towns. A very significant feature in connection with the information contained in the letter is the immense number of towns that have bought in carloads. There is no question if all the selling organizations will put on a sales force sufficient to cover their territory thoroughly to cultivate trade in small towns, distribution will continue to increase, relieving the pressure in the big cities and maintain a high average price, and the fear of overproduction will have passed. Again we repeat, we do not believe it is a case of overproduction, but a lack of distribution. This year's results have been conclusive evidence—the Northwest has moved by far the heaviest crop of box apples ever handled in less time, with the widest distribution, bringing more satisfactory prices than for several past seasons.

Put the farm machinery in first-class order during odd times this winter. An hour spent in repair may prevent later on a day of despair.



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The labor of an entire year may be swept away by one night of frost. The one sure and absolutely dependable way to save your crops from ruin by frost is to install the

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It never fails. Burns cheap fuel oil. Can be lighted quickly. Produces maximum heat, evenly distributed. Burns long time on one filling. No waste—you light only as many heaters as required to maintain desired temperature.

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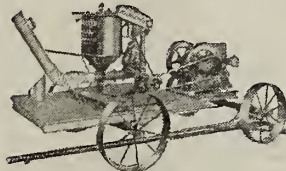
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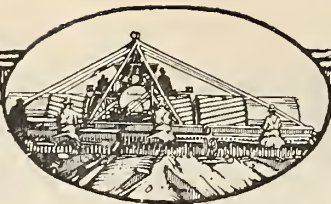


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285 lbs.

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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

The Washington State Horticultural Meeting held at Kennewick, Washington, in January was a most successful meeting. Unfortunately the editor of BETTER FRUIT was unable to be present, but the secretary, in a personal letter, has stated that the address on pruning by Professor Gardner was unquestionably one of the best on this subject ever given. The address on transportation by J. Curtis Robinson of the Northwestern Fruit Exchange was highly instructive and valuable. Incidentally, the editor wishes to call attention to the fact that no matter how clean your crop is or how large, if transportation facilities are not adequate the fruit grower is up against it. Therefore transportation is primarily the first consideration of the fruit grower. The subject "Alfalfa as Conserving Moisture," by Mr. P. S. Darlington was especially good, and "The Abuse of Water," by Mr. Fisher gave the fruit grower some valuable information, so that these few talks, not mentioning any others on the program were so valuable that the expense of attending was only a small item, comparatively. Unfortunately weather conditions and flood damages prevented many growers from being present. One hundred and fifty had bought tickets at Yakima, but on account of the washouts were unable to reach Kennewick.

The orchardist, especially if he has young trees, or where the orchard is in cover crops, should watch out for gophers this spring, because they do damage that cannot be repaid, frequently eating off the roots of the tree so that the fruit grower loses the tree. Whenever a grower is troubled with gophers he should make it a point to rid his place of them as rapidly as possible. There are two ways to get rid of gophers—by the use of poisons or the use of traps. There are a number of good traps on the market and a few brands of gopher poison that have given the growers who have used them excellent results. If you buy poison for killing gophers be sure and get a first-class brand, one that is known to do the business. If you buy traps be sure to buy a kind that has proved effective.

The Great Northern Railway Company of St. Paul has issued a very attractive booklet, "The Silo, a Mark of Progress," which gives some very valuable information about silos in general, which can be secured by any of the fruit growers in Minnesota, North and South Dakota, Idaho, Washington, Oregon and Montana by having their banker inform the Great Northern Railroad of St. Paul that they are thinking of purchasing a silo.

Mr. Gerald Da Costa of London, through FRUIT BETTER, sends very hearty greetings to his friends in the Western States wishing them a prosperous New Year, and fervently hopes that the promise of brighter times may be fulfilled in order that business may be resumed with America, as previously.

Studies in Fruit-Bud Formation

By J. R. Magness, Assistant in Research Laboratory,
Oregon Agricultural College.

Continued from last issue

In considering the conditions in the tree associated with fruit-bud formation, it is necessary to have clearly in mind how the tree is nourished, and the functions of the different parts of the tree. The roots absorb water, with dissolved minerals from the soil, transport them to the trunk, and serve as a storage place for the products of the leaves. They also, of course, serve to anchor the tree. The trunk, branches and twigs support the leaf area, serve to carry the water and mineral foods from the roots to the leaves, and foods from the leaves to all parts of the tree, and act as a storage place for elaborated food from the leaves. In the leaves, air is taken into the plant, together with the carbon dioxide contained in it. Water and mineral foods from the soil are supplied by the roots. The substances are all brought together, and in the presence of light from the sun, are combined by certain of the leaf organs into sugars, starches, etc. These so-called elaborated foods formed in the leaves, are the only ones which are directly available to the plant for tissue building.

The kind of growth made by the tree at any particular time, varies very largely with the relative amount of the different kinds of food it has available for use at that time. For example, if there is a large amount of the unelaborated food from the roots being supplied, and a relatively small amount of elaborated food from the leaves, vegetative growth in shoot length is stimulated. When a relative abundance of elaborated food is present, fruit-bud formation and increase in thickness of shoots occurs. Fruit-bud formation is apparently associated with a relative abundance of elaborated food in the immediate region of the bud. This con-

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in material and construction. No weight for team to carry. You get perfect results and long wear with a

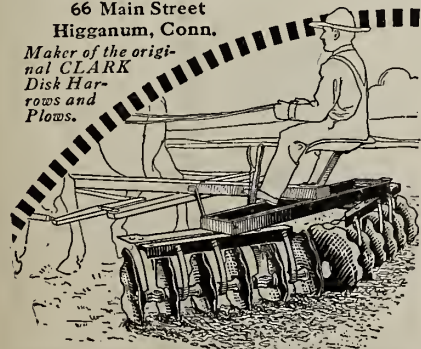
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WHEN WRITING ADVERTISERS MENTION BETTER FRUIT

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SHENANDOAH, IOWA

clusion is supported by the following facts:

1. The time of initial fruit-bud formation, and the position in which it occurs, shows a correlation to the amount of elaborated food present. It has been mentioned before that fruit buds do not begin to form before late June and July, and they may not form until much later than this. The leaf area of the tree, and hence the food

manufacturing area, is at its maximum expanse by this time, while usually the intake through the roots is less than earlier in the season, due to dryer conditions. Thus the elaborated food is coming into relatively greater abundance. Also it was mentioned that in spurs, on the average, this initial flower part formation occurs earlier in the season than on the one-year-old wood. On each spur, we have a number of

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leaves intimately associated with a single bud, while on the year wood there is but a single leaf subtending each bud. Consequently, it is to be expected that the elaborated food supply would become abundant at an earlier date in the region of the larger leaf area. Hence, the fact that these buds are formed at an earlier date indicates that their formation is associated with the elaborated food supply.

In our deciduous tree fruits, regardless of whether the fruit buds are formed on one-year wood or on spurs, they are usually found in that region of the tree in which the largest leaf area has the best exposure to the light. This is the region in which the greatest elaborated food manufacture is going on, and is another indication of the association of elaborated food manufacture and fruit-bud formation.

2. The influence of removing a ring of bark, or partially girdling the tree, upon the formation of fruit buds in the tree is another indication of conditions in the tree essential to fruit-bud formation. When we cut through the bark, it becomes impossible for any elaborated food from the leaves to pass down into the roots, since the elaborated food is transported through bark. Consequently, such a treatment will usually soon lead to the accumulation of elaborated food in the top of the tree. In such trees, a large number of fruit buds are almost invariably formed. We have often seen trees almost girdled by winter injury, which during the following summer formed flower parts in almost every bud on the tree.

3. Finally chemical analysis has shown that fruit buds are formed on those spurs and branches which show the highest percentage of starch stored during the winter. While this work has been carried on only on a very limited scale, results that have been obtained in those instances in which it has been done entirely bear out the theory that fruit buds are formed when the elaborated food supply is abundant.

From a consideration of all these facts, we reach but one conclusion, namely, that whatever the real cause of fruit-bud formation may be, it is very closely associated with the elaborated food supply. We must emphasize again, however, that it is a relative abundance of elaborated food as compared to the raw food from the roots, rather than the absolute amount, that is correlated with fruit-bud formation.

The question that naturally arises then in connection with such a discussion is this, What is the practical application of this study of fruit buds? How, if at all, is orchard practice to be regulated by this knowledge of conditions in the tree associated with fruit-bud formation?

1. How are we to induce fruit-bud formation in very vigorously growing trees that have reached bearing age, but do not produce blossoms? We must work for a relative abundance of elaborated food in the tree. The methods of regulating elaborated food supply may be grouped under two heads. (1) Regulating leaf area, and its exposure to the light. (2) Regulating the intake of raw

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Fig. 1604 "New Alert"

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Will spray your trees for several years at one cost. A trial will convince you.

1/2" Perfect Spray Hose in 50 ft. lengths coupled. 6 ply.

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Either kind stands 600 lbs test. For any power or hand sprayer.

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They Fit and They Last—

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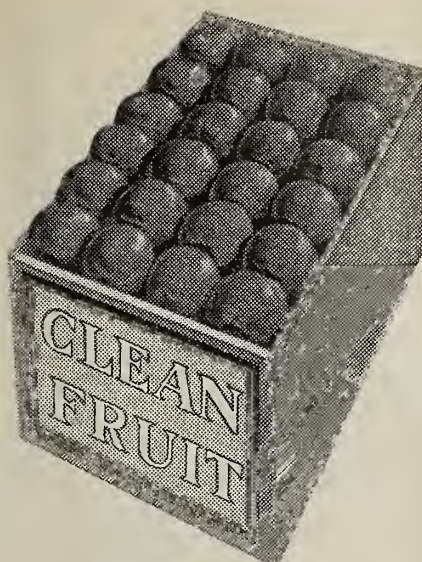
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material from the soil. Leaf area will be regulated by the pruning which the tree receives.

This pruning should be such as to stimulate as far as is consistent with tree form, the formation of that portion of the tree which produces the greatest leaf area relative to the amount of wood growth. With most kinds of fruit, this is the spurs. Any type of pruning which tends to reduce the number of spurs, tends to reduce the relative leaf area, and reduces the tendency to form fruit buds on spurs. Winter pruning reduces the potential leaf area by removing buds that would otherwise have formed leaves, hence tends to delay bearing. No pruning at all will usually result in the largest leaf area, and consequently an entirely unpruned tree will usually come into bearing first. Needless to say, however, we cannot afford to allow our trees to become badly out of shape to get a small amount of fruit somewhat earlier. Our pruning should be such as to allow the largest number of leaves possible, per unit of wood present, with the best possible light exposure, and still keep the tree in shape.

Pruning is not the only consideration in bringing about the formation of fruit buds. One of the easiest ways to increase the relative amount of elaborated food is to lessen the intake through the roots. If irrigation is practiced, allow the ground to dry out somewhat during late summer. If clean cultivation has been given, diminish it for a year or two. If the soil is very rich, and the trees vigorous, it may be advisable to plant a grain crop for one or two years. Anything that will cut down the moisture supply for the trees will tend toward fruit-bud formation. This kind of treatment, with pruning that will leave a good leaf area, should be successful in inducing fruit-bud formation in trees that do not bloom.

2. But how about the treatment for those trees which tend to produce a great crop of bloom, but lack vigor to mature a good crop of fruit? Usually in such trees we find a large number of spurs, with a considerable leaf area, while the soil is somewhat depleted. The leaves receive enough raw food from the roots to manufacture some elaborated food, and fruit buds are formed, but the large number of buds with the small raw food intake renders the elaborated food supply too small to mature fruit. Again, the treatment must be two fold. The number of buds must be reduced, and the root intake must be stimulated. Rather than removing all the buds from certain parts of the tree, it is essential that we remove some of the buds from all over the tree. In other words, instead of removing a few big limbs, we must remove a large number of small twigs and spurs from all parts of the tree. The stimulus of the pruning comes in that part of the tree in which the pruning is given, and if the buds that are left are to receive more food from the roots, other buds adjacent to them must be removed.



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In connection with the reduction in the number of buds in all parts of the tree, the soil must be so managed that root intake will be stimulated. If any element of fertility is lacking, it should be supplied in the form of fertilizer. Barnyard manure is always good for trees in this condition. Especially are cover crops valuable to improve the condition and fertility of the soil. If the orchard has been in sod, cultivation will be advisable. Soil treatment for such trees is fully as essential as the pruning given.

3. Finally, how does this knowledge of fruit-bud formation help us to deal with the alternate bearing habit of many varieties of apples and pears? It is essential that we maintain conditions in the tree such that fruit buds will be formed every year, if the tree is to bear every year. If the tree is allowed to produce a very heavy crop one year, it is extremely likely that so much elaborated food will be used up in developing the fruit that very few, if any, fruit buds will be formed. Hence, it is essential that we so thin the fruit that an excessive crop is never produced. It is also essential that in thinning, all the fruit be removed from many of the spurs, for a spur will usually not produce fruit buds during the same year it matures a fruit. Finally, the thinning should be done as early as possible. Fruit-bud formation begins by July 1, and thinning should be completed as soon after this as possible. This method of thinning, with regular pruning and cultural treatments, should go far toward preventing trees from assuming the alternate-bearing habit. When the habit is once firmly established, it is very hard to break.

In conclusion, then, we may say that in all our orchard operations we should bear in mind how they will affect the conditions of nutrition in the tree, and how these conditions will affect fruit-bud formation. Each orchard, and in fact, each tree presents a different problem. We must bear in mind the conditions we are seeking to bring about in the trees, and regulate our pruning and cultural practices accordingly.

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of lost efficiency, and that this stupendous waste causes the congestion that finally breaks down the system.

Mr. McAdoo is not making this appeal through any considerations of personal gain or profit to the railroads, but as a matter of patriotism and national safety. The highest possible efficiency of the railroads of the nation is absolutely necessary to put this country where it must stand if it is to carry on successfully the great struggle in which it is now involved. Every thoughtless citizen, merchant, shipper, business man who takes one hour needlessly out of the combined force necessary for success is just as guilty—possibly without realizing it—as the criminal who pulls a brick from the foundation of a great structure. Comparatively few need be thus removed to bring the whole mass down in terrible wreck, and this is what, by the Director General's appeal, he is earnestly struggling to avoid. Every patriotic citizen in the nation should get behind him with earnest and vigorous support, and it can be done in no more effective manner than by exercising the utmost effort to unload and release freight cars without an unnecessary moment's delay.

Rice Recipes

Left-Over Rice

Although rice has remarkable food value, it has little individual taste, and so takes on the flavor of the dish with which it is combined. This quality makes rice an excellent foundation for milk and cheese dishes, or combination with meat, chicken and fish in stews. Rice can be combined with any vegetable, made into a variety of desserts, used to thicken soups or mixed with wheat flour or cornmeal in bread making. Even a spoonful left over can be stirred into bread, mixed in chicken stuffing or dropped in the soup pot. Left-over rice may be browned in fat for breakfast or made into cakes by adding an egg, a little milk, flour to thicken and a teaspoon of baking powder. These rice cakes are delicious with syrup.

Rice Cornbread

Cooked rice can be used in any cornbread dough. It adds lightness to the bread. From the rice growers of Louisiana comes this recipe for rice cornbread: 3 eggs, 1 pint milk, 1½ cups boiled rice, 1½ cups cornmeal, 2 teaspoons fat, 1 teaspoon salt, 1 teaspoon baking powder. Beat eggs very light, add milk and other materials. Beat hard and bake in shallow greased pan in hot oven.

Rice Hash

Put in a pan one cup each of boiled rice, cooked meat cut fine, and hot water. Season with one teaspoon each of salt, chile pepper, and chopped onion. Boil fifteen minutes.

Baked Hash of Rice and Meat

Put in a stew-pan one cup each of chopped meat, cooked rice and milk, two tablespoons of fat, one teaspoon of salt, one-fourth of a teaspoon of pep-

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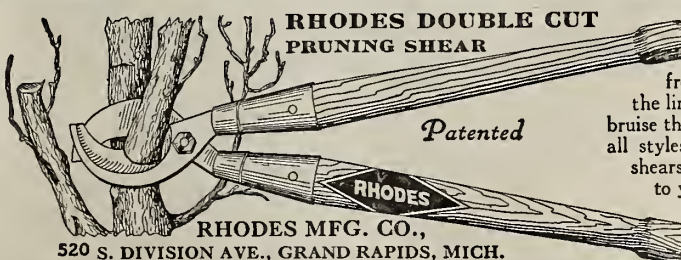
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per. Stir for one minute, then add a well-beaten egg. Turn the hash into a baking dish and bake twenty minutes.

Roast Goose or Duck Stuffing

Four onions, four apples, four leaves each of sage and thyme; fry these in two tablespoons of fat till brown; add boiled rice until of a desired stiffness. Season with salt, pepper and cayenne.

Codfish Balls With Rice

One pint of codfish, two pints of potatoes, one cup of boiled rice, one tablespoon of fat, two beaten eggs, three teaspoons of milk. Mix together and make into balls and fry in deep fat. Serve hot.

Rice Stew

Boil together one can of English peas, one-half cup of rice, one teaspoon of salt, pepper to taste, one tablespoon of fat, and one cup of sweet milk. Thicken with flour. Serve very hot in a hot dish. Cover the top with grated cheese before sending to the table.

"The Housekeepers' Apple Book," by Miss L. Gertrude Mackay, published by Little, Brown & Company, Boston, price 75 cents, postage extra, is a very interesting and valuable book for every housekeeper. If a large sale and distribution of this book could be made it would certainly be a factor in increasing the consumption of apples. The average family, properly supplied with apples for eating fresh and as dessert, will consume two boxes a month during the winter months. There are from ten to twelve thousand fruit growers in the Northwest. If every fruit grower would buy three or four of these books and send to his friends or relatives in the cities in the East, such a method could easily be a factor in creating a sale for nearly half a million boxes extra. Those who receive the book would undoubtedly speak of it to others and in this way consumption would still further be increased. It is surprising to see how many apples a family will eat when they learn to serve them many different ways. The editor's family consume about a box of apples every week during the season.

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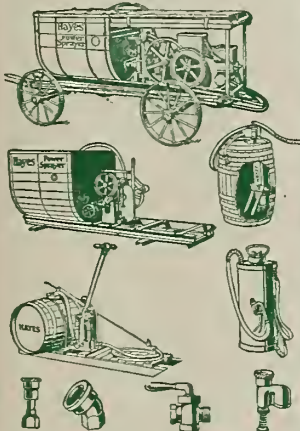
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